PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H01B

A2

(11) International Publication Number: WO 00/42621

(43) International Publication Date: 20 July 2000 (20.07.00)

(21) International Application Number: PCT/US00/00824

(22) International Filing Date: 12 January 2000 (12.01.00)

(30) Priority Data:
60/115,519 12 January 1999 (12.01.99) US

(71) Applicant *(for all designated States except US)*: MICROCOATING TECHNOLOGIES, INC. [US/US]; 3901 Green Industrial Way, Chamblee, GA 30341 (US).

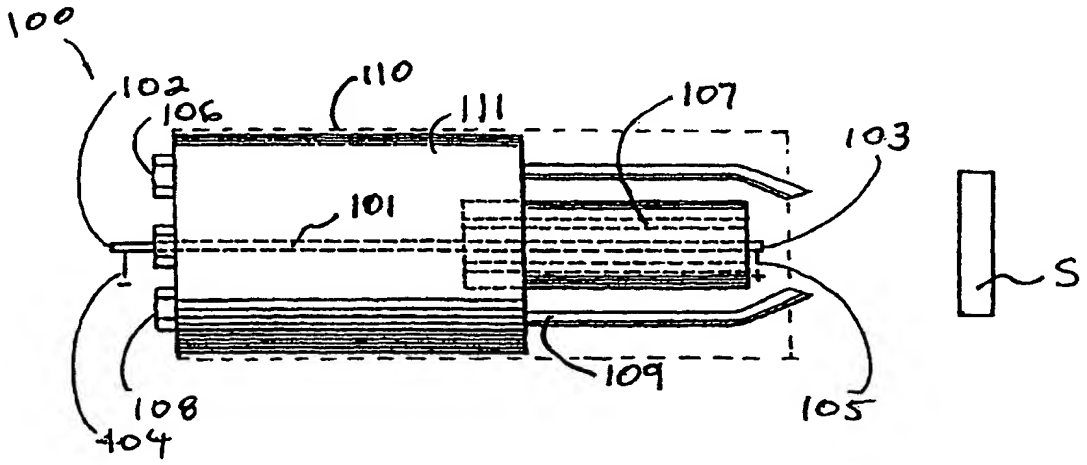
(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: HUNT, Andrew, T. [US/US]; 495 Mountain Way, Atlanta, GA 30342 (US). DESHPANDE, Girish [IN/US]; 330 Windmont Drive, Atlanta, GA 30329 (US). COUSINS, DonaldHWANG, Tzyy-Jiuan, Jan [US/US]; 510 Oak Bridge Trail, Alpharetta, GA 30022 (US). LIN, Wen-Yi [-/US]; - (US). SHOUP, Shara, S. [US/US]; 5138 Chestnut Circle, Woodstock, GA 30188 (US).

(74) Agents: KELLY, Edward, J. et al.; Foley, Hoag & Eliot, LLP, One Post Office Square, Boston, MA 02109 (US).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: EPITAXIAL THIN FILMS



(57) Abstract

Epitaxial thin films for use as buffer layers for high temperature superconductors, electrolytes in solid oxide fuel cells (SOFC), gas separation membranes or dielectric material in electronic devices, are disclosed. By using CCVD, CACVD or any other suitable deposition process, epitaxial films having pore-free, ideal grain boundaries, and dense structure can be formed. Several different types of materials are disclosed for use as buffer layers in high temperature superconductors. In addition, the use of epitaxial thin films for electrolytes and electrode formation in SOFCs results in densification for pore-free and ideal grain boundary/interface microstructure. Gas separation membranes for the production of oxygen and hydrogen are also disclosed. These semipermeable membranes are formed by high-quality, dense, gas-tight, pinhole free sub-micro scale layers of mixed-conducting oxides on porous ceramic substrates. Epitaxial thin films as dielectric material in capacitors are also taught herein. Capacitors are utilized according to their capacitance values which are dependent on their physical structure and dielectric permittivity. The epitaxial thin films of the current invention form low-loss dielectric layers with extremely high permittivity. This high permittivity allows for the formation of capacitors that can have their capacitance adjusted by applying a DC bias between their electrodes.